

What is claimed is:

1. In a communications network, a method for combining data packets intended for a common communications device, comprising:
  - 5 sorting data packets received during a predetermined time period into groups according to for which communications device of said network the received data packets are intended;  
respectively time aligning the data packets in each of the groups; and  
orthogonally combining the sorted and time aligned data packets within  
10 each group.
2. The method of claim 1, wherein said received data packets are sorted using a MAC header of each of said received data packets.
- 15 3. The method of claim 1, wherein said received data packets are stored in different sections of a memory according to for which communications device of said network the received data packets are intended.
4. The method of claim 1, further comprising sorting for transmission said  
20 orthogonally combined data packets in different sections of a memory according to for which communications device said combined data packets are intended.
5. The method of claim 4, wherein said orthogonally combined data packets are stored in different sections of a memory according to which communications  
25 device of said network the combined data packets are to be transmitted.
6. The method of claim 1, wherein said orthogonally combined data packets are transmitted to an intended receiver using a single MAC header.
- 30 7. The method of claim 1, wherein a respective bandwidth required to transmit each group of said orthogonally combined data packets is substantially

the same as a bandwidth required to transmit a largest data packet in each of said groups.

8. The method of claim 1, wherein said predetermined time period is  
5 substantially greater than or equal to a total time latency for receiving data packets intended for a common communications device of said network.

9. The method of claim 8, wherein data packets in said network are  
communicated according to a global timing schedule and said time latency is  
10 due to differences in the latencies of transmission media of the communications devices of said network.

10. The method of claim 1, wherein only data packets having specific MAC  
headers are orthogonally combined.

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11. The method of claim 1, wherein data packets not orthogonally combined  
are communicated in said network according to conventional Ethernet  
protocols.

20 12. An apparatus for combining data packets intended for a common communications device in a communications network, comprising:  
a timer for defining a time period for receiving data packets;  
an addressing device for defining a storage location for said received  
data packets according to for which communications device of said network the  
25 received data packets are intended;

a memory for storing said received data packets in different sections  
according to the storage location defined by said addressing device, wherein  
the data packets stored within each of said different sections are respectively  
timed aligned; and

30 a combiner for orthogonally combining the respective time aligned data packets in each of said different sections of said memory.

13. The apparatus of claim 12, further comprising a second memory for storing said orthogonally combined data packets in different sections according to which communications device of said network the combined data packets are to be transmitted.

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14. The apparatus of claim 12, further comprising a bit scaler for defining the number of bits to be combined by said combiner.

15. The apparatus of claim 12, wherein said addressing device stores information regarding the MAC header of which data packets are to be orthogonally combined.

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16. The apparatus of claim 12, further comprising a Receive MAC for receiving data packets and a Transmit MAC for transmitting the respective orthogonally combined data packets to an intended communications device.

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17. The apparatus of claim 12, wherein said apparatus is implemented in an interconnect switch of said network.

18. The apparatus of claim 12, wherein said apparatus is implemented in at least one of the communications devices of said network.

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19. A packet network where data packets intended for a common communications device are combined, comprising:

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a plurality of communications devices; and

a switch for interconnecting said communications devices, wherein said interconnection switch includes:

a timer for defining a time period for receiving data packets;

an addressing device for defining a storage location for said

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received data packets according to for which communications device of said network the received data packets are intended;

a memory for storing said received data packets in different sections according to the storage location defined by said addressing device, wherein the data packets stored within each of said different sections are respectively timed aligned; and

5 a combiner for orthogonally combining the respective time aligned data packets in each of said different sections of said memory.

20. A packet network where data packets intended for a common communications device are combined, comprising:

10 a non-blocking switch for interconnecting communications devices of said network; and

a plurality of communications devices, wherein at least one of said communications devices includes:

a timer for defining a time period for receiving data packets;

15 an addressing device for defining a storage location for said received data packets according to for which communications device of said network the received data packets are intended;

a memory for storing said received data packets in different sections according to the storage location defined by said addressing device, wherein the data packets stored within each of said different sections are respectively timed aligned; and

20 a combiner for orthogonally combining the respective time aligned data packets in each of said different sections of said memory.